IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

Slingshot Printing LLC, Plaintiff v. HP Inc., Defendant.	§ § § § § § § § § § §	C.A. Nos. 1:20-cv-00184-ADA 1:20-cv-00185-ADA Jury Trial Demanded

DEFENDANT HP INC.'S OPENING CLAIM CONSTRUCTION BRIEF

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I. INTRODUCTION

HP pioneered thermal inkjet printing in the late 1970s and first commercialized it in 1984. In the 35 years since then, HP has invested billions of dollars in thermal inkjet technology. During all that time, HP has been an innovator and market leader. Indeed, HP invented all the technology at issue in this case first.

Since it was spun out of IBM in 1991 until it sold its business to Funai in 2013, Lexmark also competed in the thermal inkjet print market. However, Lexmark's investment in research and development and intellectual property significantly lagged behind that of HP.

In what appears to have been a defensive measure in the five years from 1999 through 2004, Lexmark filed a flurry of patents, including the patents asserted in this case. The patents are more noteworthy for their quantity than quality. Many of Lexmark's patents copied HP's designs. Others claim technology that no one practices. In 2012, Lexmark gave up on the inkjet business. The following year, it sold that business to Funai for $100M.

While Funai bought Lexmark's inkjet business, its core business has been in videotape players and recorders, DVD/Blu-ray players, and televisions. It manufactures DVD/Blu-ray products and flat-panel televisions for brands such as Magnavox, Sanyo, and Philips. With its purchase of Lexmark's inkjet business, Funai tried to make a competitive go of inkjet printing. In 2015, it reached an exclusive license with Kodak to launch Kodak-branded ink and printers. Nevertheless, Funai's inkjet business failed to thrive. For the past seven years, Funai's inkjet printer sales and market share have steadily declined.

Now, it appears that Funai has decided to try to recoup its losses with Lexmark's patents through litigation. In March 2019, Funai entered into an arrangement with Slingshot to bring this lawsuit. Slingshot has asserted 33 patents in five cases. It has already dropped two patents that even a visual inspection of HP's products reveal that HP does not practice. HP has called

out fatal flaws in numerous other assertions in a Rule 11 letter that HP sent in February 2020. Core among HP's complaints is that a reasonable investigation would have shown that the asserted patents cannot possibly be infringed if construed correctly.

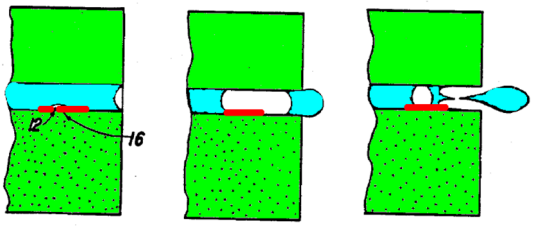
Slingshot's claim construction positions have to overcome this same challenge – Lexmark's patents claim technology that HP does not practice or that HP invented first. As a result, Slingshot proposes constructions that violate well-established claim construction principles: (1) attempting to read limitations out of claims; (2) adding ambiguity, not clarity; (3) creating claims of indefinite scope; and (4) disregarding the clear representations its predecessors made to the Patent Office to obtain allowance of the claims, often to distinguish HP prior art. HP's constructions should be adopted because they accurately capture the meaning of the disputed claim terms.

II. TECHNICAL BACKGROUND REGARDING INKJET PRINTING AND THE PATENTS AT ISSUE

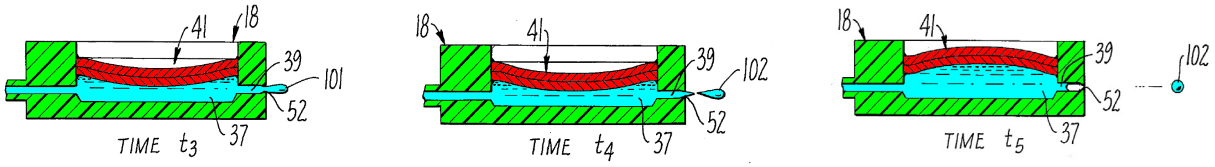
A. The Relevant Technical Background of Inkjet Printing

The asserted patents are directed to the field of inkjet printing. When the applications for the asserted patents were filed, there were three primary inkjet technologies: thermal inkjet printers that used heat to expel ink, piezoelectric inkjet printers that used an electric charge to deflect a plate to eject ink, and electromechanical actuators that used a paddle to eject ink.

A ***thermal inkjet*** printer expels ink from a nozzle by passing electric current through a resistor to heat a small volume of ink in an ejection chamber near the nozzle. The heat rapidly raises the temperature of the ink above its boiling point and causes ink within the chamber to vaporize and quickly expand, thereby ejecting a droplet of ink from the nozzle. This process is illustrated in the figures below, where a resistor (red) in the ejection chamber (green) is heated by a current and vaporizes ink to eject a drop of ink (cyan) through a nozzle.



Piezoelectric printers utilize the phenomenon that certain materials change shape when subjected to an electric field. This process is illustrated below: a pressure plate (red), such as a piezoelectric transducer, flexes in response to an electrical signal. This flexing pressurizes ink in a chamber (green) and ejects a drop of ink (cyan) through a nozzle.



Printers that use ***electromechanical actuators*** use small, moving parts, *e.g.*, paddles, that move in response to electrical stimulus to propel ink out of an ejection chamber. An exemplary paddle is shown in the figures below, where a heater (red) causes a paddle (orange) to propel a drop of ink (cyan) out of a chamber (green).

Fig. 4(a)

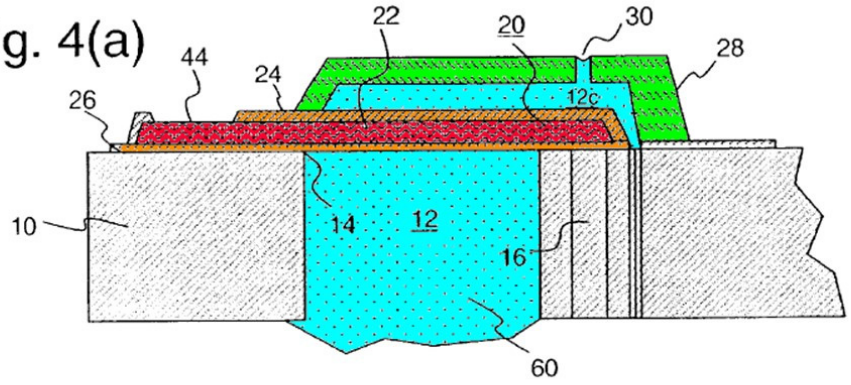
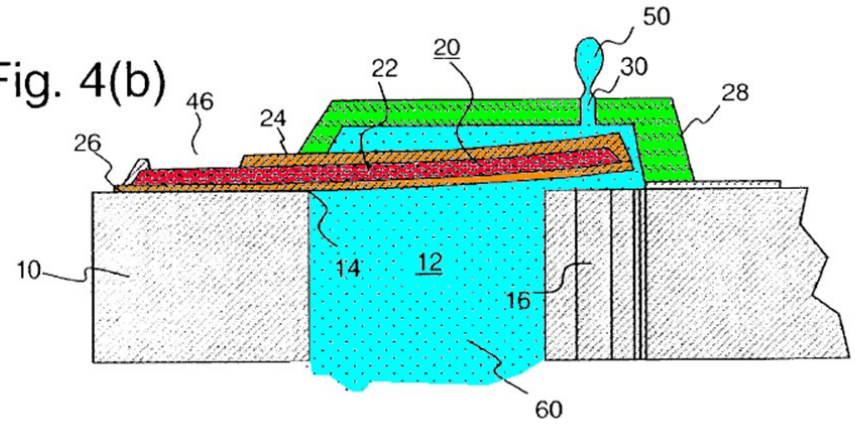


Fig. 4(b)



In each approach to inkjet printing, the print process involves ejecting ink droplets out of an ejection chamber through a nozzle and onto a print medium, *e.g.*, paper. All of these methods commonly used at least one array of nozzles in a printhead integrated circuit, or chip. A printhead chip uses the same materials and methods of construction as a semiconductor chip. By the early 2000s, when some of the applications for the asserted patents were filed, inkjet printers could already print 600 dots per inch (dpi). Print companies achieved such print resolutions by using semiconductor manufacturing processes for the printhead chips.

A printhead chip is typically mounted directly on a cartridge that contains a supply of ink. These cartridges were often disposable, such that upon exhaustion of the supply of ink in the cartridge, the cartridge (and its printhead chip) would be discarded and replaced with another cartridge. Alternatively, a printhead chip could be permanently or semi-permanently mounted in

a printer, and a remote ink supply, such as an ink tank, could provide ink to the printhead chip. Upon exhaustion of ink from this remote ink supply, the supply could be replenished or replaced without replacing the printhead.

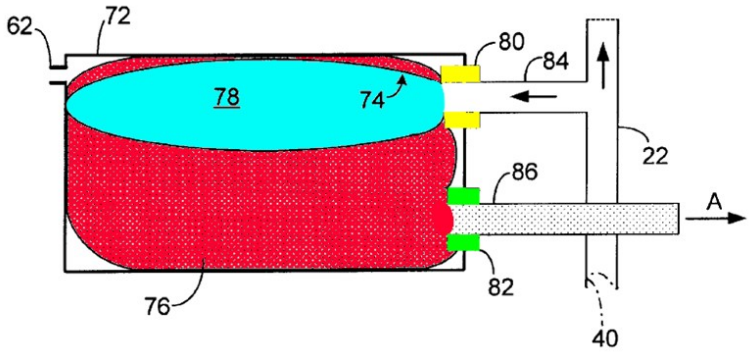
HP's innovations include ink cartridge pressure regulation and supplying ink to ejection chambers in the printheads at an appropriate pressure (a slight vacuum) to prevent ink from leaking out of the printhead. Several of the asserted patents concern maintaining this pressure.

The patents addressed in this brief fall into two areas: (1) the control and venting of pressure in an inkjet cartridge; and (2) the geometry of the ink ejection chambers. A brief description of the patents in each group is below.

B. The Pressure/Venting Patents (-184 Case)

Three of Slingshot's asserted patents are directed to controlling pressure in an inkjet cartridge: U.S. Patent Nos. 6,243,115 (the "'115 patent") (Ex. 1)[1]; 6,394,593 (the "'593 patent") (Ex. 2); and 6,817,707 (the "'707 patent") (Ex. 3). Each is described below.

The **'115 patent** is directed to a system that uses an air pump to apply pressure to a resilient air container in an ink supply. The expansion of the resilient air container causes ink to be expelled through an ink outlet. An exemplary embodiment is shown below.



[1] Citations to "Ex." refer to the exhibits attached to the concurrently filed Declaration of Andrew V. Devkar in Support of Defendant HP Inc.'s Opening Claim Construction Brief.

Among other things, this embodiment includes an air inlet 80 (colored yellow); an ink outlet 82 (green); an air pump (not shown) connected to the air inlet for creating a positive pressure in the interior of the printer cartridge 72; an ink source 76 (red); and a resilient air container 74 (blue). Ink is forced from the ink source 76 through the ink outlet 82 upon expansion of the resilient air container 74 from a positive pressure created by the air pump.

The **'593 patent** is directed to a venting system for an ink cartridge that permits air to flow between a chamber of a pressure regulator in the ink cartridge and the atmosphere while substantially inhibiting the escape of water vapor from the chamber. An exemplary embodiment is shown below:

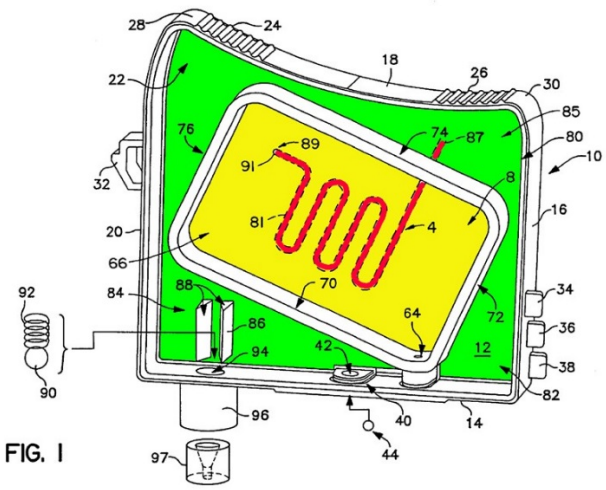


FIG. 1

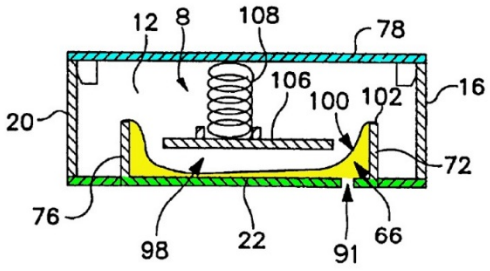


FIG. 6

Among other things, this embodiment includes a body 10 including a first panel 22 (green) and a second panel portion 78 (blue), which together form a cavity, some of which is reserved to contain ink. The embodiment also includes a chamber 66 (yellow); a "lung type" pressure regulator 98 (shown in Fig. 6); and an air diffusion path disposed between the chamber 66 and atmosphere comprising an elongate flow path 81 (red).

The **'707 patent** is directed to a pressure-controlled ink supply assembly. The materials of specific components are chosen so that the melting point of a pressure control structure is lower than the melting point of an ink reservoir. This allows for a flexible film to be heat welded to the pressure control structure while avoiding warping or deformation of the ink reservoir. An exemplary embodiment is shown below:

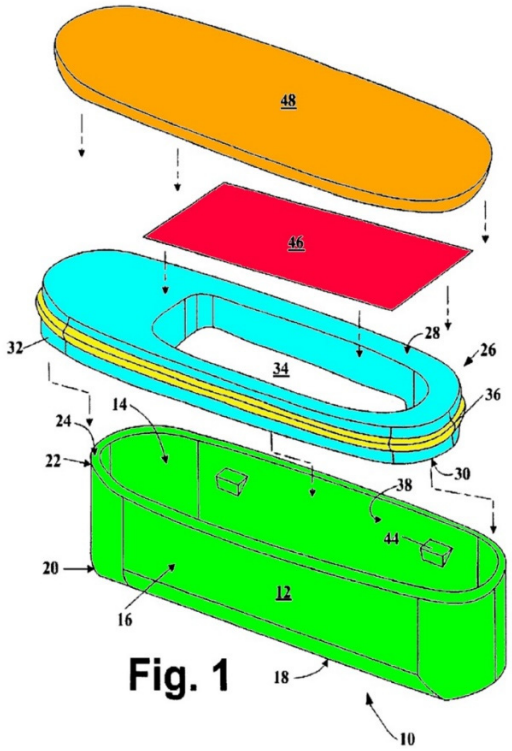


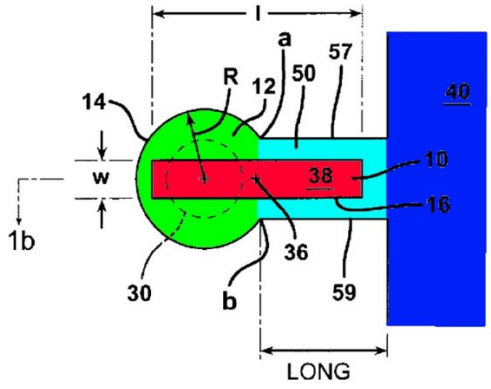
Fig. 1

Among other things, this embodiment includes an ink reservoir 12 (green); a pressure control structure 26 (blue); a sealing structure 36 (yellow); a pressure regulating film 46 (red); and a cover 48 (orange).

C. The Ejection Chamber Patents (-185 Case)

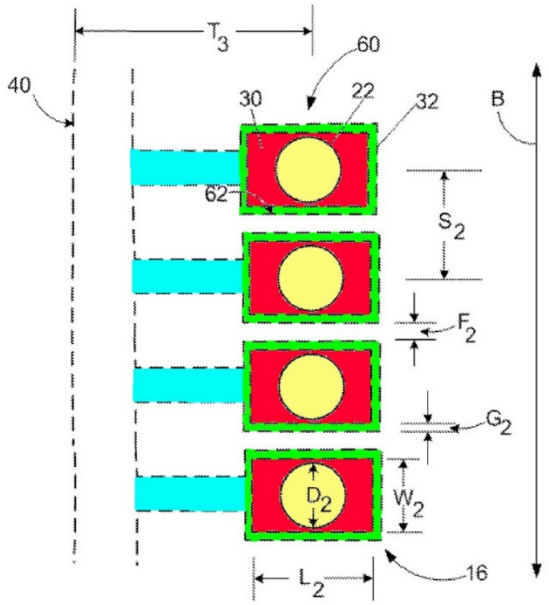
Slingshot has asserted patents directed to the geometry of the ink ejection chambers and related features, such as the actuators and nozzles, including U.S. Patent Nos. 6,719,405 (the "'405 patent") (Ex. 4) and 7,152,951 (the "'951 patent") (Ex. 5).

The **'405 patent** is directed to a printhead chip having heater elements and ink ejection chambers of specific geometries. An exemplary embodiment is shown below:



Among other things, this embodiment has an ink via 40 (dark blue), a substantially rectangular heater element 38 (red); a substantially straight ink flow channel 50 (light blue); and a bubble chamber 12 (green) having a curved wall portion 14 partially surrounding said heater element 38.

The **'951 patent** is directed to an inkjet printhead chip having actuators with a particular aspect ratio and a column of nozzles having a particular pitch (spacing). An exemplary embodiment is shown below:



The figure shows a semiconductor substrate containing at least one ink feed edge 40 and a plurality of ink ejection actuators 30 (red) as well as a thick film layer having a plurality of ink feed chambers 32 (green) and ink feed channels (light blue).

III. LEVEL OF ORDINARY SKILL IN THE ART

A person having ordinary skill in the art at the time of the alleged inventions of the asserted patents would have been a person holding at least a Bachelor's level college degree in Mechanical Engineering, Electrical Engineering, Physics, or a related field and at least two years of training and experience in the design of inkjet cartridges and/or printheads.

IV. ARGUMENT

A. Disputed Terms from the Pressure/Venting Patents (-184 Case)

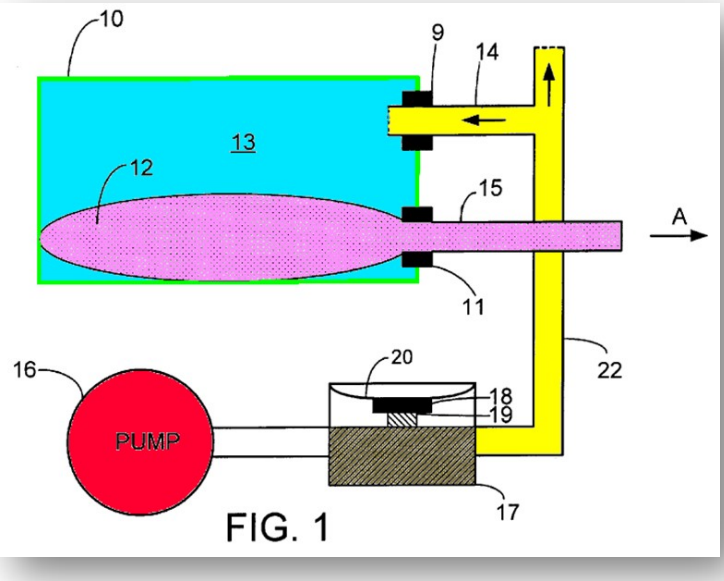
1. "resilient container" / "resilient air container" ('115 patent, claims 1, 3, 11)

HP's Proposed Construction	Slingshot's Proposed Construction
a flexible receptacle that expands and collapses, such as a bag	a container that is capable of returning to its original shape, position or form after being deformed

Contrary to the meaning of "resilient" in the context of the '115 patent, Slingshot wants to read the term "resilient container" to encompass rigid structures that do not expand or collapse. The terms "resilient container" and "resilient air container" are used in the specification exclusively to describe flexible receptacles for air or ink that expand and collapse. The resilient containers are shown and described as bags that expand and collapse in order to force ink out of an ink cartridge. During prosecution, the Applicant also distinguished prior art having a container with rigid walls on the basis that it lacked a "resilient air container," and Slingshot cannot reclaim that claim scope now. Slingshot's attempt to impermissibly broaden the scope of the claims should be rejected, and HP's construction should be adopted.

a. The specification uses "resilient" exclusively to describe a container that expands and collapses, such as a bag.

The '115 patent discloses four embodiments, shown in Figures 1-4, involving different configurations of a resilient or non-resilient air container and a resilient or non-resilient ink container. Figure 1 shows a printer cartridge with a non-resilient air container (interior 13 of printer cartridge 10, shown in blue below) and a resilient ink container 12 (magenta).



'115 patent at Fig. 1.[2]

The Specification provides that "[t]he ink source 12 is a ***resilient*** container," which is shown in Figure 1 "embodied as a ***bag***." '115 patent at 3:49-52. The resilient nature of the ink container allows "air pressure in the printer cartridge 10 [to] force ***collapse*** of the resilient container [12] to drive ink therefrom and through the ink outlet 11." *Id.* at 3:52-54. The '115 patent does not disclose that printer cartridge 10 expands or collapses and does not describe it as resilient, which is to be expected because printer cartridges are generally constructed of rigid plastic. Figure 1 uses curves to depict ink source 12 (a resilient bag) and straight lines to depict

[2] All colorization to figures has been added.

printer cartridge 10 (a non-resilient structure that does not expand or collapse during operation).

Figure 2 discloses the opposite arrangement: the printer cartridge has a resilient air container 28 (blue bag shown below) and a non-resilient ink container (cartridge 26, green) with interior 30 containing ink (magenta).

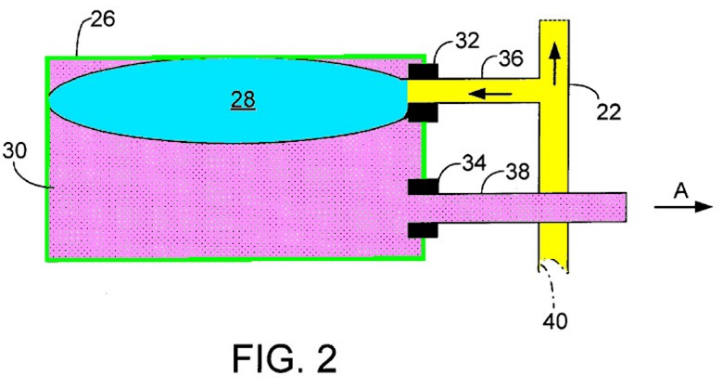


FIG. 2

'115 patent at Figure 2.

In describing this embodiment, the '115 patent uses the term "resilient" to describe the air container 28 and discloses that, as "the pump 16 creates a positive pressure in the resilient air container 28," it "caus[es] the container [28] to ***expand*** and force ink from the interior." '115 patent at 4:57-63. In contrast, the '115 patent does not describe printer cartridge 26 as resilient and does not disclose that the printer cartridge 26 expands or contracts. Moreover, as with Figure 1, Figure 2 uses curves to depict air container 28 (*e.g.*, a resilient bag) and straight lines to depict printer cartridge 26 (non-resilient), which does not expand or collapse during operation.

In Figures 3 and 4, both the air container (blue) and ink container (magenta) are resilient containers (*e.g.*, bags); the only difference between the two cartridges is the relative location of the containers.

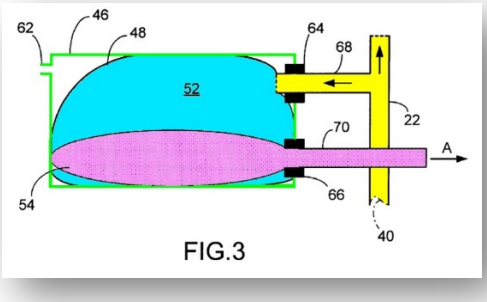


FIG.3

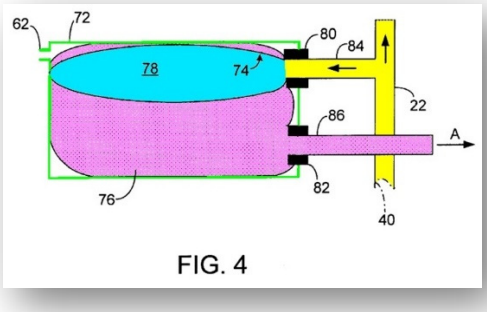


FIG. 4

'115 patent at Figs. 3, 4.

In Figure 3, the air container 48 (blue) encapsulates the ink container 54 (magenta), whereas in Figure 4, the air container 74 (blue) is positioned within the ink container 76 (magenta). The '115 patent describes all four containers in these embodiments as resilient. '115 patent at 5:3, 5:4-5, 5:26, 5:27. Regarding the embodiment shown in Figure 3, the '115 patent states that "[t]he air pump 16 creates a positive pressure in the resilient air container 48, causing the resilient air container 48 to ***expand***, which places pressure on the ink source resilient container 54 to ***collapse***." *Id.* at 5:13-16. Similarly, regarding the embodiment of Figure 4, the '115 patent states that "positive pressure in the resilient air container 74 causes ***expansion***, which places pressure on the ink source resilient container 54 [sic – 76] that is bound by the printer cartridge 72. Thus, the ***expansion*** pressure forces ink from the ink source resilient container 76…." *Id.* at 5:34-38, 6:22-35. Figures 3 and 4 depict the resilient air containers and the ink containers as bags.

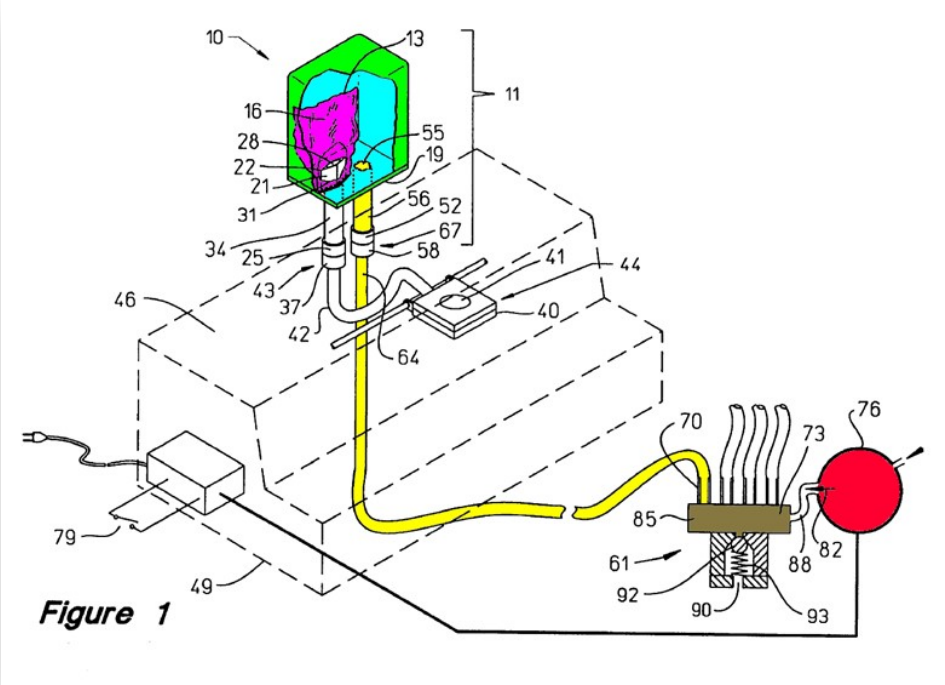
Therefore, in every embodiment of the '115 patent and throughout its specification, when the patent describes a container as resilient, it means a container that expands and collapses, such as a bag. The specification specifically provides a "bag" as the example of a resilient container. *See, e.g.*, *id.* at 2:1-2 ("The ink source is preferably a resilient container, such as a bag."). In all

of the patent figures, the resilient containers are consistently shown with rounded edges so as to represent a bag-like receptacle. *See* Figs. 1-4. In contrast, wherever a container is depicted with straight lines, *e.g.*, the solid body of an ink cartridge, the patent never describes the container as resilient and never suggests that it is intended to expand or collapse.

b. The Applicant distinguished prior art that allegedly lacked a "resilient" container, and Slingshot cannot recapture this claim scope now.

The prosecution history also confirms the correctness of HP's proposed construction. Slingshot's proposed construction violates an essential principle of claim construction by urging that the claims encompass what the Applicant surrendered during prosecution. The term "resilient air container" (or "resilient air containing means") was added to the independent claims to overcome the prior art.

On November 30, 2001, the Examiner issued an Office Action in which all independent claims were rejected as being anticipated by an HP patent, U.S. Patent No. 6,030,074 to Barinaga ("Barinaga"). Ex. 6 at 3-4. Barinaga discloses an apparatus for delivering pressurized ink to a printhead.



Ex. 7 at Fig. 1.

As shown in color above, Barinaga discloses an air compressor 76 (red) that provides pressurized air through air chamber 85 (brown) and gas conduits 64 and 56 (yellow) to container 10 (green). This positive pressure exerts a pressure on ink bag 13 (magenta). Ex. 7 at 4:64-5:5.

The Examiner indicated that certain dependent claims contained allowable subject matter, including claims that recited a "resilient air container" or "resilient air containing means." Ex. 6 at 5. As shown in Fig. 1, the (non-resilient) container 10 of Barinaga is depicted with straight lines, just like the walls of the (non-resilient) printer cartridge in the '115 patent specification. *See* '115 patent, Figs. 1-4. The Applicant amended the independent claims to include the "resilient" elements to secure allowance. Ex. 8 at 2-6. Thus, the Examiner allowed the claims because Barinaga's air container was not resilient.

Slingshot's attempt to recapture the surrendered claim scope contradicts the Examiner's rationale in allowing the claims over the prior art. *See Convolve, Inc. v. Compaq Comput. Corp.*,

812 F.3d 1313, 1322-23 (Fed. Cir. 2016) ("In determining the scope of the claims, we apply the traditional claim construction principles . . . paying particular attention to the examiner's focus in allowing the claims after amendment.") (internal quotations omitted).

Thus, the prosecution history confirms that HP's construction is correct.

c. Slingshot's proposal ignores the specification and the surrender of claim scope during prosecution.

Slingshot's proposed construction of the term "resilient container" as "a container that is capable of returning to its original shape, position or form after being deformed" is an improper attempt to encompass a relatively rigid plastic ink cartridge. This is plainly inconsistent with usage of the term "resilient" in the '115 patent. The '115 patent never describes the walls of the ink cartridge as resilient. *See* Section IV.A.1.a, *supra*. Moreover, the Applicant secured allowance of the '115 patent over the Barinaga prior art reference (which showed an air container with straight lined walls) by adding to the independent claims the requirement that the air container be resilient. Thus, a "resilient container" excludes containers having relatively rigid sidewalls like those shown in Barinaga. Slingshot's proposed construction should be rejected to prevent it from seeking to have the claims cover what was surrendered during prosecution.

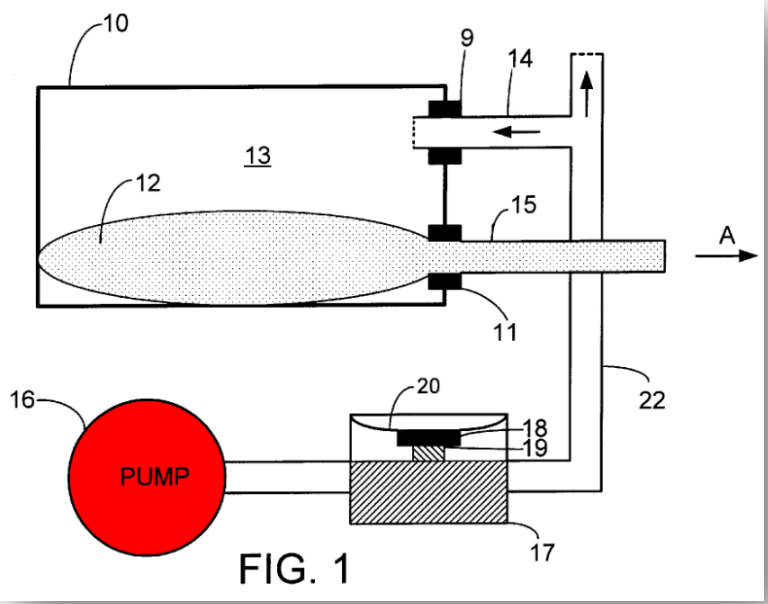
Accordingly, in view of the specification and file history, a "resilient [air] container" should be construed as a flexible receptacle that expands and collapses, such as a bag.

2. "pressure supply means" ('115 patent, claim 9)

HP's Proposed Construction	Slingshot's Proposed Construction
Subject to 35 U.S.C. § 112, ¶ 6 Function: creating a positive pressure in the interior of the printer cartridge Structure: air pump, and equivalents thereof	Subject to 35 U.S.C. § 112, ¶ 6 Function: creating a positive pressure in the interior of the printer cartridge Structure: reciprocating piston pump, vane pump, peristaltic pump, centrifugal pump, diaphragm pump, or other compressor, and equivalents thereof

The parties agree that this term is written in means-plus-function format and is subject to 35 U.S.C. § 112, ¶ 6. The parties also agree as to the recited function. The parties have only a minor disagreement as to the structure disclosed in the specification corresponding to the recited function. HP's identification of the corresponding structure is correct because it follows what the specification specifically described as performing the recited function.

The only structure disclosed in the specification for performing the recited function is the "air pump 16" (colored red in the figure below):



'115 patent at Fig. 1.

The '115 patent states that "the air pump 16 ***creates a positive pressure*** in the interior 13 of the printer cartridge 10." *Id*. at 3:33-36 (emphasis added). The specification discloses that "[t]he air pump can be ***any pressure supplying device***, ***such as*** a reciprocating piston pump, peristaltic pump, centrifugal pump, diaphragm pump, or other compressor as known in the art." *Id.*, 4:6-10 (emphasis added). Thus, the "pressure supply means" is an air pump and equivalents

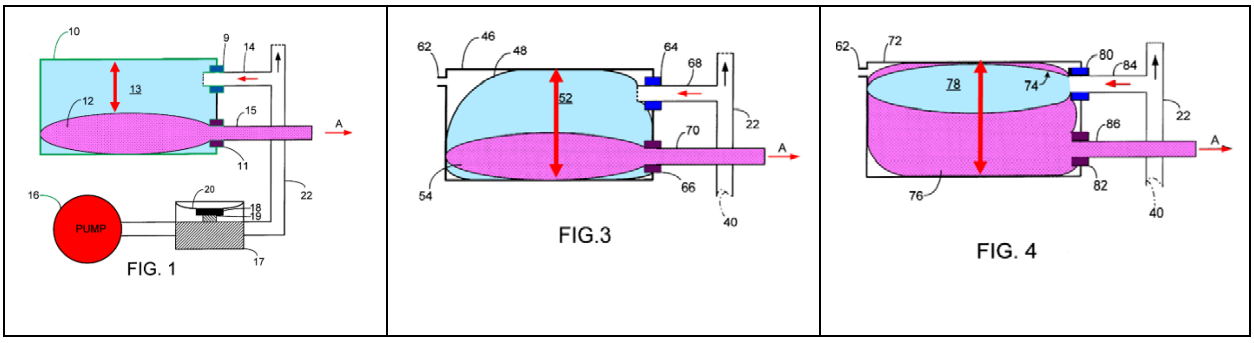
thereof. Slingshot's proposed structure is incorrect because it does not identify the air pump specifically disclosed in the specification as performing the recited function and reflected in HP's construction. In addition, to the extent Slingshot's list of pumps are appropriate for performing the recited function, they are already encompassed by HP's proposed construction.

3. "ink supply means" ('115 patent, claim 9)

HP's Proposed Construction	Slingshot's Proposed Construction
Subject to 35 U.S.C. § 112, ¶ 6 Function: supplying ink from the printer cartridge Structure: printer cartridge or ink bag, and equivalents thereof	Subject to 35 U.S.C. § 112, ¶ 6 Function: supplying ink from the printer cartridge Structure: printer cartridge or ink container (e.g., bag), and equivalents thereof

The parties agree that this term is recited in means-plus-function format and is subject to 35 U.S.C. § 112, ¶ 6. The parties also agree as to the recited function. The dispute as to the corresponding structure is minor. HP's proposed construction is correct and is the same construction that was presented in HP's petition for IPR regarding the '115 patent. Rather than agree to this construction, Slingshot proposes a trivial variation.

The structures in the specification for performing the recited function are the resilient ink containers disposed within the printer cartridges—namely, ink source 12 (Fig. 1), ink source resilient container 54 (Fig. 3), and ink source resilient container 76 (Fig. 4):



'115 patent at Figs. 1, 3, 4.

The only other structure disclosed in the specification that can perform the recited function is the interior 30 of the Figure 2 cartridge:

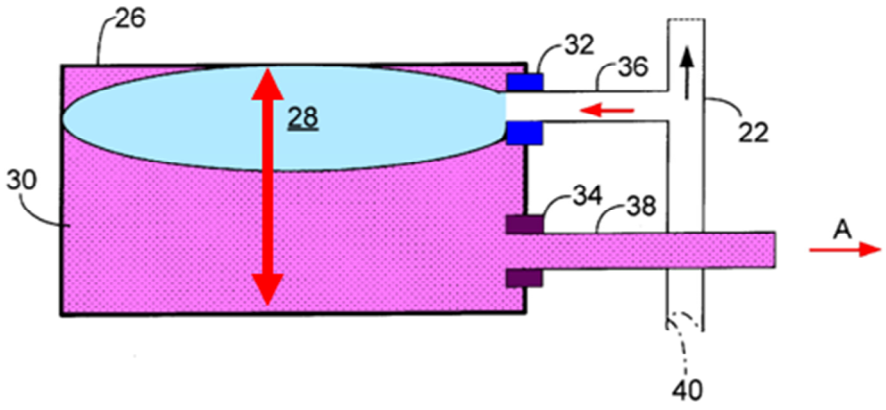


FIG. 2

Id. at Fig. 2, 4:54-64 ("FIG. 2 illustrates an alternative embodiment of the ink supply and delivery system with printer cartridge 26 having an interior 30 filled with ink").

Thus, the "ink supply means" is the printer cartridge or ink bag, and equivalents thereof. Slingshot's addition of "ink container" as one of the structures linked to the claimed function is unsupported. "Ink container" does not appear in the specification of the '115 patent and thus cannot qualify as corresponding structure. *See Ergo Licensing, LLC v. CareFusion 303, Inc.*, 673 F.3d 1361, 1364 (Fed. Cir. 2012) ("[A] patentee is only entitled to the corresponding structure ***described in the specification*** and equivalents thereof.") (alterations omitted) (emphasis in original).

4. "resilient air containing means" ('115 patent, claim 9)

HP's Proposed Construction	Slingshot's Proposed Construction
Subject to 35 U.S.C. § 112, ¶ 6 Function: containing air and expanding from the positive pressure created by the pressure supply means for forcing the ink from the ink supply means through the ink outlet.	Subject to 35 U.S.C. § 112, ¶ 6 Function: containing air and expanding from the positive pressure created by the pressure supply means for forcing the ink from the ink supply means through the ink outlet.

Structure: resilient air container, bag, and equivalents thereof	Structure: resilient air container (e.g., bag) and equivalents thereof

The parties agree this term should be construed under 35 U.S.C. § 112, ¶ 6 and agree as to the recited function. The dispute as to the corresponding structure is minor, but HP's construction is correct because the specification specifically identifies a "bag" as corresponding structure.

The '115 patent discloses that the recited function can be performed by only the resilient air container 28 (Fig. 2), the resilient air container 48 (Fig. 3), and the resilient air container 74 (Fig. 4):

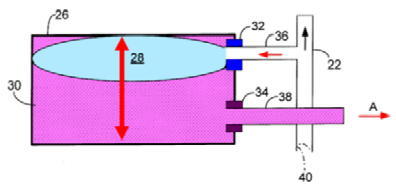


FIG. 2

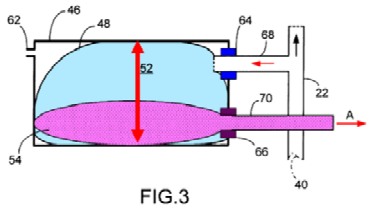


FIG.3

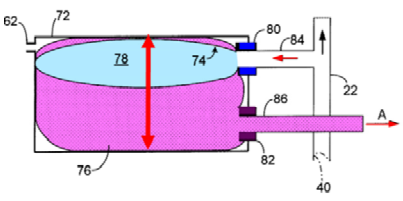


FIG. 4

'115 patent at Figs. 2-4; *see also id.* at 4:58-63, 5:12-17, 5:32-39. The resilient air container is shown as a bag in the figures, and the specification discloses a "bag" as the example of a resilient container. *See, e.g.*, '115 patent at 2:1-2 ("The ink source is preferably a resilient container, such as a bag.").

Thus, the "resilient air containing means" should be construed as a resilient air container, bag, and equivalents thereof.

Slingshot's proposal to add "e.g.," and parentheticals for the recitation of "bag" is similar to HP's proposed construction on its face but improperly suggests that there are other examples disclosed in the specification. HP's proposal should be adopted because a bag is the specifically disclosed structure in the specification corresponding to the recited function.

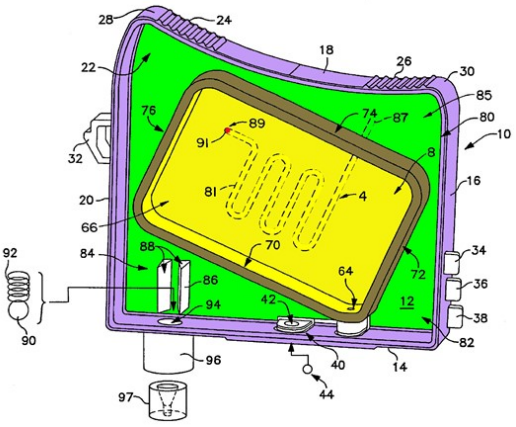
5. "chamber" ('593 patent, claims 1, 12, 13)

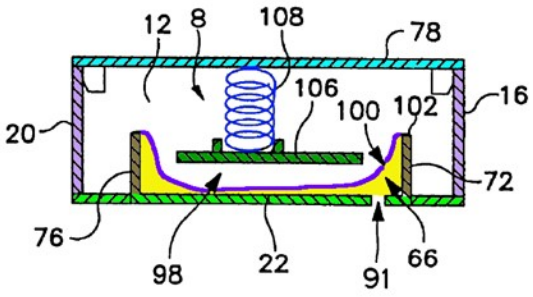
HP's Proposed Construction	Slingshot's Proposed Construction
an enclosed space having one or more walls	an expanding and contracting enclosed space

The parties agree that the claimed chamber is an "enclosed space." The parties disagree as to whether the enclosed space must be "expanding and contracting." The plain and ordinary meaning of "chamber" does not include this requirement. Rather, the more common meaning of "chamber" is a static space such as a room. Ex. 9 at 308; Ex. 10 at 202. Nothing in the specification or file history suggests that "chamber" should be construed narrowly as Slingshot suggests. Thus, the term "chamber" encompasses both static spaces and non-static spaces, unless the Applicant clearly disclaimed static spaces or otherwise redefined the term to refer only to expanding and contracting spaces. *Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1358 (Fed. Cir. 2003) (holding that disclaimer of claim scope "requires clear and unmistakable statements of disavowal"); *Hill-Rom Services, Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (holding that the standard to show that the patentee acted as its own lexicographer is "exacting"). The Applicant did neither.

HP's proposed construction is consistent with the plain and ordinary meaning of "chamber." "Having one or more walls" clarifies that a "chamber" has a volume, *i.e.*, that it represents an enclosed space. In contrast, Slingshot's proposed construction of "chamber" turns the ordinary meaning of the term on its head. Slingshot wants to read "chamber" on the interior of a collapsible bag, but a "bag" is not a chamber, nor can a chamber be something that does not occupy space, *e.g.*, a collapsed bag.

HP's proposed construction is confirmed by the specification. The '593 patent discloses a chamber 66 (yellow in the images below) that is formed by lung frame walls 70, 72, 74, and 76 (brown) and a portion of first side panel portion 22 (green). '593 patent at 4:25-29.





'593 patent at Figs. 1, 6.

Lung frame walls 70, 72, 74, and 76 (brown) ensure that chamber 66 (yellow) is an enclosed space and that chamber 66 can never collapse. Piston member 106 (dark green) and urging member 108 (blue), which are disposed in cavity 12, urge polymeric material 100 (dark purple in Fig. 6) toward the first side panel portion 22, but the polymeric material 100 (dark purple) will be kept away from the first side panel portion 22 (green) near the lung frame walls 70, 72, 74, and 76 (brown). *See* '593 patent at 6:65-7:1.

HP's proposed construction should be adopted because it is consistent with the plain and ordinary meaning of the term "chamber" and the intrinsic evidence.

6. "substantially . . . gas impermeable cover" / "substantially . . . vapor impermeable cover" ('593 patent, claims 2, 13)

HP's Proposed Construction	Slingshot's Proposed Construction
a cover having properties such that the transmission of gas through the cover is substantially less than the diffusion of gas out of the channel to the atmosphere / a cover having properties such that the transmission of vapor through the cover is substantially less than the diffusion of vapor out of the channel to the atmosphere	a cover having properties such that the transmission of gas through the cover is substantially less than the diffusion of gas out of the channel to the atmosphere, (i.e., the cover is substantially impermeable to liquid/gas so that liquid/gas is directed through the channel) / a cover having properties such that the transmission of vapor through the cover is substantially less than the diffusion of vapor out of the channel to the atmosphere, (i.e., the cover is substantially impermeable to liquid/vapor so that liquid/vapor is directed through the channel)

HP's proposed construction tracks the definition for "substantially vapor impermeable" in the specification. This definition is equally applicable to the term "substantially . . . gas impermeable," as Slingshot appears to concede. The parties disagree as to whether the additional language that Slingshot appends to the specification's definition (the language following the "i.e.") should be included. HP's proposal should be adopted because it is the precise definition provided by the specification.

A patent applicant may assign a specific meaning to a claim term by acting as a lexicographer. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (*en banc*). The patentee expressly defined the term "vapor impermeable" as follows: "[t]he term 'substantially vapor impermeable' ***means*** that the transmission of water vapor through the cover 93 is substantially less than the diffusion of water vapor out of end 87 of the conduit 81 to the atmosphere." '593 patent at 6:7-11 (emphasis added). HP's proposed construction adopts this clear definition. Slingshot does not dispute that the definition supplied by the applicant for "substantially . . . vapor impermeable" applies equally to the term "substantially . . . gas impermeable."

Slingshot's additional language is unnecessary and would reduce clarity. First, "i.e." is a term that can cause disagreement, even by trained legal professionals. *See TF3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1372 (Fed. Cir. 2018) (overturning PTAB's interpretation of "i.e." in patent specification). Given that the goal of claim construction is to clarify claim terms for a jury, *see I/P Engine Inc. v. AOL, Inc.*, 874 F. Supp. 2d 510, 523 (E.D. Va. 2012), "i.e." should be avoided. Second, the words added by Slingshot recycle the claim language itself (as shown below), and add unnecessary words without providing any clarity.

> the cover is substantially impermeable to liquid/gas so that liquid/gas is directed through the channel
>
> the cover is substantially impermeable to liquid/vapor so that liquid/vapor is directed through the channel

For these reasons, HP's proposal should be adopted.

7. "a first melting point" / "a second melting point" ('707 patent, claim 1)

HP's Proposed Construction	Slingshot's Proposed Construction
Indefinite --Alternatively-- the temperature at which the first material changes phase from a solid to a liquid / the temperature at which the polymeric material changes phase from a solid to a liquid	a temperature at which the first material changes phase from a solid to a liquid / a temperature at which the polymeric material changes phase from a solid to a liquid

These claim terms recite a "melting *point*," and the fact-finder therefore needs reasonable clarity as to a specific *point* that melting occurs. However, the terms are indefinite because many materials, including plastics used in the inkjet printing art, do not melt at a single temperature. Rather, these materials change phase over a range of temperatures—in some cases, a significantly broad range. A person of ordinary skill in the art would not know which temperature in such a melting *range* to identify as the "melting *point*," and the '707 patent provides no guidance on this issue. Precision for these terms is critical because the claims

require that the second melting point be lower than the first melting point. Without precision as to how the "melting point" of the materials should be determined, a person of ordinary skill in the art would not know how to apply the claim. Under binding precedent, the terms are therefore indefinite. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014) (holding that, to be definite, a patent's claims must "inform those skilled in the art about the scope of the invention with reasonable certainty").

If the Court determines that the terms are not indefinite, then the terms must be construed as "*the* temperature"—the specific temperature constituting the melting *point*—at which the respective materials change phase. Slingshot's proposed construction, "*a* temperature" at which the respective materials change phase, lacks precision in the context of materials that change phase over a temperature range and would improperly force a jury to identify a specific temperature within ranges to use when comparing two such melting points.

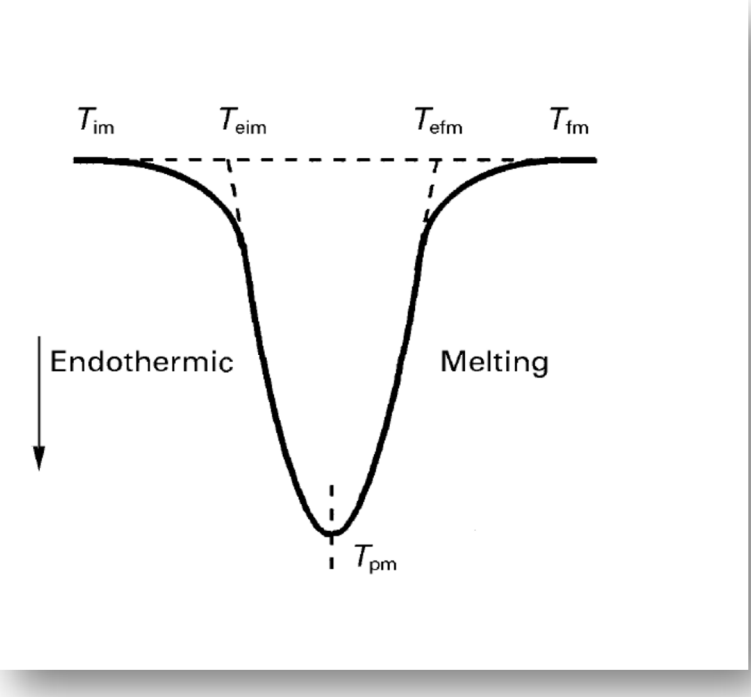
a. The first and second "melting point" terms are indefinite.

Many materials and substances have a well-defined "melting point." For example, H_20 has a melting point of 0 °C (at atmospheric pressure). At any temperature below 0 °C, H_20 is ice. At any temperature above 0 °C, it is water.

The first and second "melting point" terms are indefinite because the claims of the '707 patent purport to cover materials that do not change phase at a single discrete temperature. The '707 patent claims, however, require that the materials have a single, discrete melting temperature. *See* '707 patent at 3:21-22, 3:38-40 (stating that the material of the ink reservoir preferably has "a melting or softening point above about 150° C" and that the material of the pressure control structure preferably has "a melting point of about 120° C"). It is not clear whether the patent's mention of a "softening point" is different from the claimed "melting

point." However, even in the context of a "softening point," the '707 specification implies that there is a single, identifiable softening *point* (temperature). *See id.*

For the thermoplastic materials disclosed in the specification, some parts liquefy at a first temperature, other parts of the material remain solid until a higher temperature, and the remaining parts of the material melt at some intermediate temperature or range of temperatures. This phenomenon is described in an International Organization for Standardization (ISO) standard. In particular, ISO standard 11357-3, which would have been the relevant standard at the time of the '707 patent, "specifies a method for the determination of the temperature and enthalpy of melting and crystallization of crystalline or semi-crystalline plastics." As shown in Figure 1 of the standard, there is no single temperature at which such plastics melt.



Ex. 11 at Figure 1 (partial). The image above represents the differential scanning calorimetry (DSC) curve of a crystalline or semi-crystalline plastic. *Id.* at 1-2.

As shown in Figure 1, a characteristic crystalline or semi-crystalline plastic melts over a range of temperatures, spanning from temperature T_{im} though Temperature T_{fm}. Other designated temperatures within this range include T_{eim} (defined as the extrapolated onset temperature), T_{pm} (defined as the peak temperature) and T_{efm} (defined as the extrapolated end temperature). *See id.* The ISO standard does not specify which, if any, of these five different temperatures, is the "melting point" of the plastic. *See id.* Likewise, the '707 patent does not provide any guidance on this issue.

In summary, many plastics change phase over a range of temperatures, and the '707 patent fails to specify any precise temperature within such a range to treat as the "melting point." Accordingly, because the specification teaches that such plastics are the intended materials for embodiments of the '707 patent claims, the "melting point" claim terms are indefinite. *See* '707 patent at 3:11-25, 4:14-42.

The Federal Circuit has found similar claims indefinite in *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335 (Fed. Cir. 2015) and *Dow Chem. Co. v. NOVA Chems. Corp. (Canada)*, 803 F.3d 620 (Fed. Cir. 2015). In *Teva*, the claim at issue was directed to a method of manufacturing a particular copolymer with a "molecular weight" falling within a certain range. *Teva*, 789 F.3d at 1338. Because the "molecular weight" of a polymer could be measured in three different ways, yielding three different results, and because the patent did not specify which method it contemplated, the Federal Circuit held that the claim was indefinite. *Id.* at 1345 ("[T]here is not reasonable certainty that molecular weight should be measured using [one of the three ways].").

In *Dow*, the claims were directed to a polymer having a material property defined as "a slope of strain hardening coefficient greater than or equal to 1.3." *Dow*, 803 F.3d at 624-25. The

patent taught that the slope of strain hardening coefficient (SHC) is calculated according to the formula SHC = (slope of strain hardening)*$(I_2)^{0.25}$, where I_2 = melt index in grams/10 minutes. *Id.* at 631. However, the patent did not teach how the "slope of strain hardening" was to be calculated, and four different methods existed, each yielding a unique result. *Id.* at 633. The choice as to which method to use could determine whether or not a given product infringes the claim. *Id.* at 634. Based on this uncertainty, the Court found the claims invalid as indefinite. *Id.*

Here, as in *Teva* and *Dow*, any of the values for the five temperatures T_{im}, T_{eim}, T_{pm}, T_{efm}, and T_{fm}, might be identified as the purported "melting point" for crystalline or semi-crystalline plastics. The '707 patent does not specify which point (if any) might be identified as the "melting point." Accordingly, the claims are indefinite under Federal Circuit precedent.

b. If the Court believes the "melting point" terms are amenable to construction, they must be construed as "***the*** temperature" at which the respective materials change phase.

If the Court does not determine the "melting point" terms to be indefinite, the terms must be construed to require a specific temperature at which the recited materials change phase. This is necessary so that the first and second melting points may be compared to each other, as required by claim 1 of the '707 patent. HP's alternative construction, beginning "*the* temperature...," is consistent with the plain and ordinary meaning of the term "melting point." Ex. 12 at 740 (defining "melting point" as "***the*** temperature at which a solid melts") (emphasis added); *see also* Ex. 13 at 704.

Slingshot's proposal, that the "melting point" terms be construed as "***a*** temperature" at which a material changes phase, invites ambiguity and should be rejected. For materials that change phase over a range of temperatures, Slingshot's apparent goal is to be able to choose any temperature in that range. However, the Federal Circuit's holdings in *Teva* and *Dow* do not permit claim scope to depend on the *post hoc* whim of the plaintiff. The claims require a

material to have a melting ***point***—this needs to be an identifiable temperature, or the claims are indefinite. It is unacceptable to suggest that a material has a "melting *point*" consisting of any temperature, or all temperatures, within a potentially broad range of melting temperatures.

Slingshot's proposal is especially problematic in view of the claim language requiring a comparison of two melting points ("second melting point lower than the first melting point"). A simple hypothetical illustrates the problem with Slingshot's proposal. Assume Material A melts in the range of 100 °C to 120 °C and Material B melts in the range of 105 °C to 115 °C. Material A might be argued to have a lower melting point under Slingshot's proposal, because Material A begins to change phase at 100 °C and, at that temperature, Material B does not undergo any phase transformation. On the other hand, Material B might be argued to have a lower melting point because, after it has reached 115 °C, it has fully changed phase, while Material A is still undergoing phase change. Either argument would be incorrect, and the Court should foreclose the possibility that the fact-finder has to try to answer these improper inquiries.

8. "sealing structure" ('707 patent, claim 1)

HP's Proposed Construction	Slingshot's Proposed Construction
Subject to 35 U.S.C. § 112, ¶ 6 Function: forming a liquid tight seal between the sidewalls of the ink reservoir and the side surface of the pressure control structure Structure: elastomeric o-ring or bead of adhesive, and equivalents thereof	Plain and ordinary meaning

Claim 1 recites: "a sealing structure for forming a liquid tight seal between the sidewalls of the ink reservoir and the side surface of the pressure control structure." This element is recited in functional language and should be construed under § 112, ¶ 6. The term "sealing structure" does not define a definite structure but rather purports to cover all structures that perform the function of sealing the ink reservoir to the pressure control structure. Although the term does not use the word "means" (*i.e.*, "sealing means"), the element is otherwise recited just

as if the term "means" had been used. Moreover, the term "structure" is exactly the type of "nonce" word that operates as a substitute for "means" in the context of § 112, ¶ 6:

> Generic terms such as 'mechanism,' 'element,' 'device,' and other nonce words that reflect nothing more than verbal constructs may be used in a claim in a manner that is tantamount to using the word 'means' because they 'typically do not connote sufficiently definite structure' and therefore may invoke § 112, para. 6.

Williamson v. Citrix Online, LLC, 792 F.3d 1339, 1350 (Fed. Cir. 2015). The term "structure" does not provide any indication of specific structure "because it sets forth the same black box recitation of structure for providing the same specified function as if the term 'means' had been used." *Id*. Therefore, under the well-established *Williamson* standard, "sealing structure" is a textbook example of a term that should be construed under § 112, ¶ 6.

The recited function for the claimed "sealing structure" is: "forming a liquid tight seal between the sidewalls of the ink reservoir and the side surface of the pressure control structure." As shown below, the corresponding structure for this function is an elastomeric o-ring or bead of adhesive. With reference to the figure below, the '707 patent discloses "A sealing structure 36 is provided on side surface 32 for forming a liquid tight and air tight seal between the inner surface 38 of side walls 16 and the side surface 32 of the pressure control structure 26."

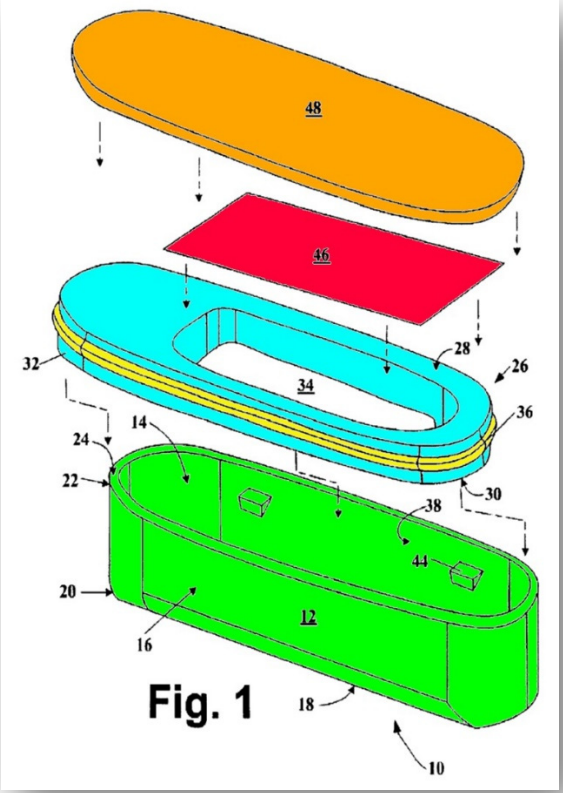


Fig. 1

'707 patent at Fig. 1.

The specification further provides that sealing structure 36 may be an elastomeric o-ring:

> The sealing structure 36 preferably provides a liquid tight and air tight seal by purely mechanical means. Accordingly the sealing structure 36 may be selected from elastomeric materials and adhesives. A particularly preferred sealing structure 36 is ***an elastomeric o-ring*** made from ethylene propylene diene monomer (EPDM). Regardless of whether the sealing structure 36 is an adhesive or elastomeric o-ring material, it is preferred that the sealing structure 36 be substantially chemically resistant to the components of ink used in the printhead assembly 10.

Id. at 3:54-64.

The specification also discloses that an adhesive bead may be used as the sealing structure 36:

> As shown in more detail in FIG. 2, the pressure control structure 26 preferably includes a peripheral groove 40 in the side surface 32 thereof. The groove 40 is

> preferably dimensioned to accept an o-ring or ***bead of adhesive*** as the sealing structure 36.

Id. at 3:65-4:2. Accordingly, HP's proposed construction should be adopted under a straightforward application of *Williamson*.

B. Disputed Terms from the Ejection Chamber Patents (-185 Case)

1. "heater element" ('405 patent, claims 1, 7, 17)

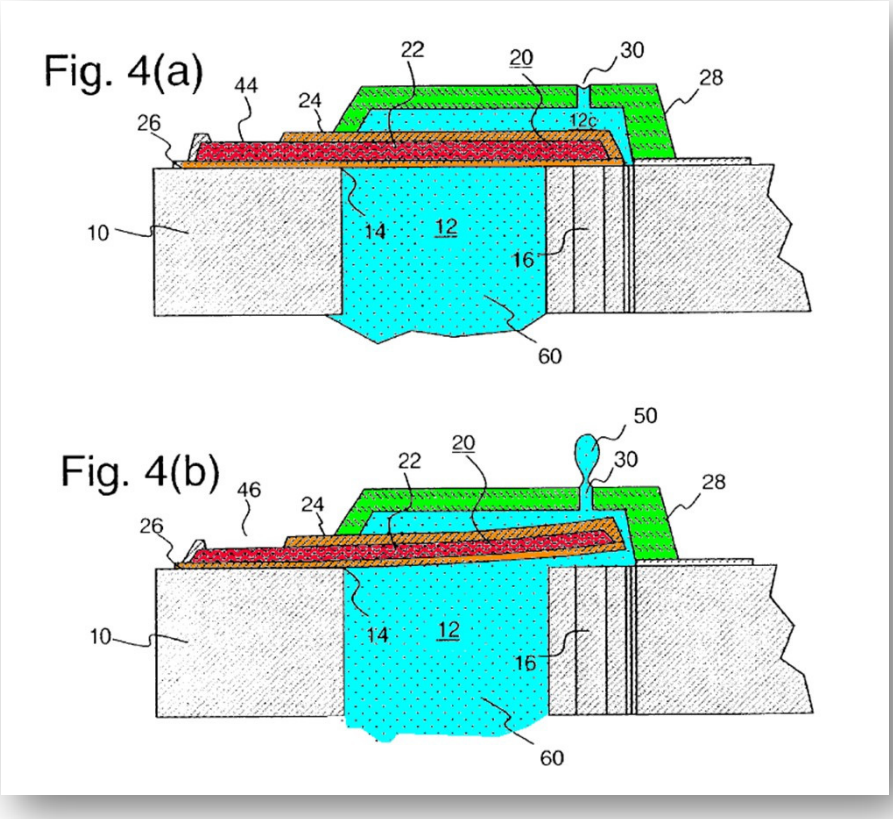
HP's Proposed Construction	Slingshot's Proposed Construction
Plain and ordinary meaning	a heater that vaporizes ink

In an attempt to avoid invaliding prior art, Slingshot violates claim construction principles by seeking to import aspects of the preferred embodiment. There is no basis to narrow the term "heater element" as Slingshot proposes.

The term "heater element" is straightforward and does not require construction. Slingshot recycles the word "heater" in its proposed construction, implicitly conceding that "heater" does not need further explanation. That leaves the word "element." Slingshot replaces "element" with the limitation that the heater "vaporizes ink." However, there is no reason to limit the claimed "heater element" to only one "that vaporizes ink." That the preferred embodiment of the '405 patent includes a heater that vaporizes ink is not a sufficient basis to limit the claims. *Phillips*, 415 F.3d at 1323 ("In particular, we have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment."). Instead, "heater element" should be given its plain and ordinary meaning unless one of the recognized exceptions apply. A person of ordinary skill in the art would have known that there are various types of heater elements in the art of inkjet printing. In fact, Slingshot's other asserted patents in these actions confirm the breadth of the known heater elements (fluid firing elements) that are known in the art. *See, e.g.,* '299 patent at 2:53-57 ("The fluid firing elements may embody thermally resistive heater elements formed as

thin film layers on a silicon substrate or piezoelectric elements despite the thermal technology implication derived from the name heater chip.").

The prior art that Slingshot is attempting to avoid includes an "electroresistive heater 22." Slingshot attempts to improperly import limitations into "heater element" to avoid the type of heater element in the prior art. More specifically, the prior art reference relates to an inkjet printer that uses these electroresistive heaters 22 to mechanically deform paddles to fling droplets of ink from an ejection chamber. As shown below, heating an "electroresistive heater 22" (shown in red below) causes thermal expansion and thus the bending of thermal actuator 20.



Ex. 14 at Figs. 4(a), 4(b). Figure 4(a) shows a relaxed, unenergized position of the thermal actuator 20, comprised of electroresistive heater 22 (heater element, shown in red) and overlayer 24 and passivation layer 26 (both shown in orange). *Id.* at 6:24-25. Figure 4(b) shows the

actuator 20 bent in response to thermal heating via electroresistive heater 22 (heater element, red). *See id.* at 6:25-26.

In view of this invalidating prior art, Slingshot seeks to narrow the term "heater element" so that the electroresistive heaters 22 are not within its scope. Slingshot's attempt to read in the limitation that the heater element must *vaporize ink* is improper. This is an attempt to read in a limitation from the preferred embodiment, plain and simple. There is no clear and unmistakable disclaimer of claim scope indicated in the intrinsic evidence. As shown in the prior art, there are "heater elements" that effectuate ink ejection by means other than vaporizing ink. The claim term would exclude these heaters only if the patentee acted as a lexicographer to define "heater element" contrary to its ordinary meaning or disavowed the full scope of "heater element." Neither action occurred. *See Cordis*, 339 F.3d at 1358 (holding that disclaimer of claim scope "requires clear and unmistakable statements of disavowal"); *Hill-Rom*, 755 F.3d at 1371 (standard for lexicography is "exacting"). Likewise, Slingshot has indicated that it may cite a number of HP patents in its argument. However, these patents (extrinsic to the '405 patent) provide no basis to narrow the term "heater element" in the '405 patent. Just as it is improper to limit the claims to the preferred embodiment of the patent in which they appear, it is improper to limit the claims to the preferred embodiment of other, unrelated patents.

Accordingly, the term "heater element" requires no construction. Alternatively, if a construction is desired, it should be non-limiting as to any specific type of heater element.

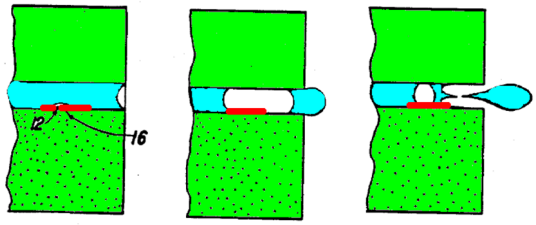
2. "bubble chamber[s]" ('405 patent, claims 1, 7, 17)

HP's Proposed Construction	Slingshot's Proposed Construction
chamber[s] from which ink is ejected	chamber[s] in which ink is vaporized to form a bubble

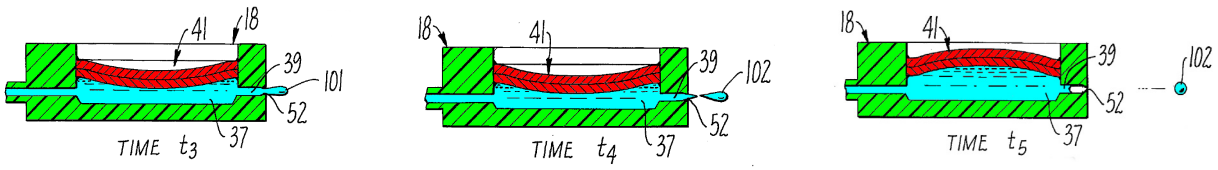
The term "bubble chambers" in the '405 patent refers to the chambers from which ink is ejected, regardless of the underlying inkjet technology. In violation of claim construction

principles, Slingshot improperly limits the term to thermal inkjet printing. *See Phillips*, 415 F.3d at 1323 (rejecting contention that claims must be limited to the single embodiment described in a patent).

At least three inkjet technologies were known to those of skill in the art at the time of the purported invention of the '405 patent, and all three ejected ink droplets from a chamber. First, a ***thermal inkjet*** printer expels ink from a nozzle by passing electric current through a resistor, which heats a small volume of ink beyond its boiling point in an ejection chamber near the nozzle. The heat causes ink in the ejection chamber to vaporized and quickly expand, thereby ejecting a droplet of ink from the nozzle. This process is illustrated in the figures below, where a resistor (red) is heated by a current and vaporizes ink in the ejection chamber (green) to eject a drop of ink (cyan) through a nozzle.



Second, ***piezoelectric*** printers utilize the phenomenon that certain materials change shape when subjected to an electric field (voltage). This process is illustrated below: a pressure plate (red), such as a piezoelectric transducer, flexes in response to an electrical signal. This flexing pressurizes ink in a chamber (green) and ejects a drop of ink (cyan) through a nozzle.



A third solution employs ***electromechanical actuators***. Such actuators are small, moving parts (*e.g.*, "paddles") that move in response to electrical stimulus to propel ink out of an ejection chamber. An exemplary paddle, described in Kodak's U.S. Patent No. 6,435,666, is shown in the figures below, where a heater (red) causes a paddle (orange) to propel a drop of ink (cyan) out of a chamber (green).

Fig. 4(a)

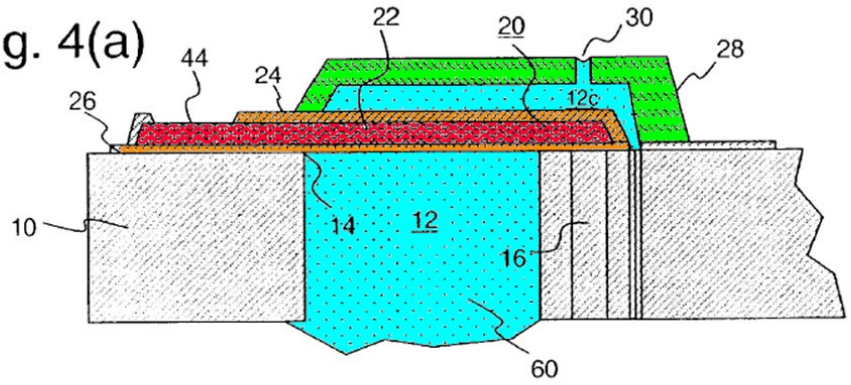
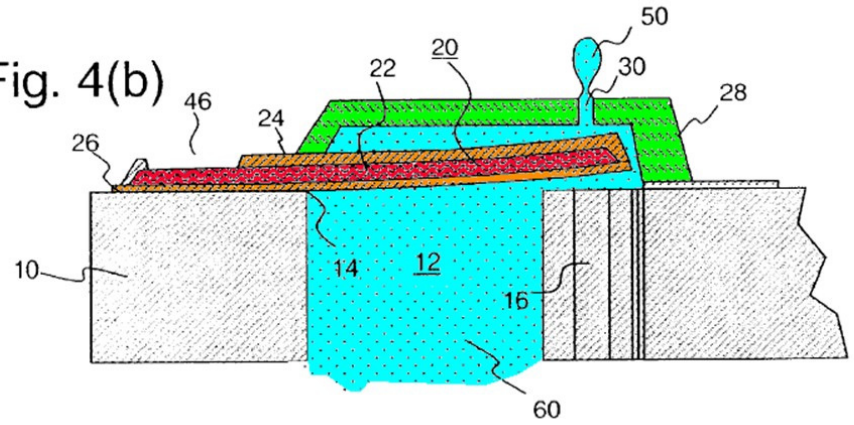


Fig. 4(b)



Ex. 14 at Figs. 4(a), 4(b).

All of these inkjet technologies employ a chamber, and the chambers are simply an enclosed space from which ink is ejected. In other words, the terms "thermal inkjet chamber," "bubble chamber," and "chamber" are relatively generic terms in the art of inkjet printing. The claims were not intended to be limited to any type of inkjet printing (or to any preferred embodiment). This intent is confirmed by the '405 patent specification. The claims at issue

begin by reciting "[a]n inkjet printhead," and the '405 patent states: "[a]s described herein, the term inkjet printhead may ***in addition to thermal technology include piezoelectric technology, or other***." '405 patent, 7:65-67 (emphasis added). This is consistent with Slingshot's other asserted patents in these actions, which also confirm an intent to broadly cover the known inkjet technologies in its patents. *See, e.g.,* U.S. Patent No. 7,014,299 (Ex. 15) at 2:53-57 ("The fluid firing elements may embody thermally resistive heater elements formed as thin film layers on a silicon substrate or piezoelectric elements despite the thermal technology implication derived from the name heater chip.").

Accordingly, the term "bubble chamber" should not be construed to exclude any type of inkjet printing, and HP's construction should be adopted.

3. "none of said convex wall portion overlies said periphery of said heater element" / "none of said curved wall portion overlies said periphery of said heater element" ('405 patent, claims 1, 7, 17)

HP's Proposed Construction	Slingshot's Proposed Construction
Plain and ordinary meaning If construction is required: no part of the convex wall portion [curved wall portion] overlies said periphery of said heater element	no wall of the bubble chamber that is convex [curved] overlies the periphery of the heater element

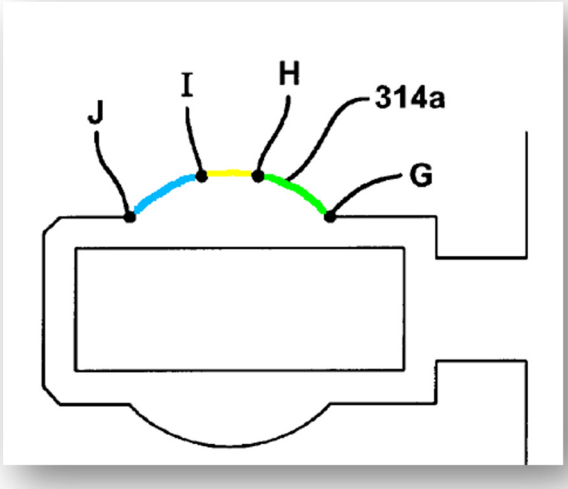
Slingshot seeks to rewrite this claim element to avoid invalidating prior art. The terms at issue appear in claims 1, 7, and 17, and the only difference among the terms is that claim 7 recites "curved wall portion" while claims 1 and 17 recite "convex wall portion." Because the parties agree that "convex wall portion" should be construed as "curved wall portion," HP addresses the term in claim 7, but this analysis applies equally to the terms in claims 1 and 17.

Claim 7 recites a heater element and a bubble chamber having a wall portion that partially surrounds the heater element. Claim 7 also cites that "none of said curved wall portion overlies [a] periphery of said heater element." This is straightforward. If a chamber has a

curved wall portion that partially (or in the case of claim 17, substantially) surrounds a heater element and does not overlay a periphery of the heater element, the element is satisfied. Accordingly, if the Court finds that this term requires construction, it should be construed as "no part of the convex wall portion [curved wall portion] overlies said periphery of said heater element."

Slingshot seeks construction of this term because the prior art is replete with chambers that satisfy the claim element. Thus, Slingshot is trying to rewrite the claim so that a printhead having multiple curved wall portions, some of which overlay a printhead and some of which do not, is outside of the scope of the claim.

The specification does not support Slingshot's attempt to rewrite the claims. On the contrary, the specification discloses that a chamber may include multiple wall portions and that only one of these portions needs to meet the required limitation. In particular, in the embodiment shown in Figure 3, a chamber wall includes multiple curved portions: G-H (colored green below), H-I (colored yellow below), and I-J (colored blue below).



'405 patent at Fig. 3 (partial, annotated).

The specification describes these curved wall portions as corresponding to portions of an oval. '405 patent at 5:30-32. Thus, according to the specification, "a radius greater than the width of the heater element and shorter than the length dimension only exists for arc portions between points G and H [green] and I and J [blue] because a straight line essentially exists between points H and I." '405 patent at 5:32-36. In other words, the radius of arc H-I (yellow) is greater than the length of the heater element. However, the specification makes clear that this embodiment is not excluded from the invention even though segment H-I (yellow) does not have the required radius of curvature: "Neither embodiment, however, should limit the curved wall portion to a particular shape, size or arc radius nor should it limit its position relative to the heater element resident in the bubble chamber." '405 patent at 5:36-39. Therefore, curved wall portions G-H (green) and I-J (blue) are sufficient to satisfy the claim element. Other curved wall portions may be disregarded.

Applying the same reasoning, as long as "a curved wall portion," *i.e.*, one or more curved wall portions, does not overlay a heater element, the disputed limitation is satisfied. *See Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008) ("That 'a' or 'an' can mean 'one or more' is best described as a rule, rather than merely as a presumption or even a convention."). The presence of other curved wall portions that may or may not overlay a heater is irrelevant. Under Slingshot's apparent logic, the element "said curved wall portion having a radius of an arc that is greater than about 0.5 said width dimension and less than said length dimension" would require that any curved wall portion have a radius within that range. But this would exclude the embodiment of Figure 3, contrary to both the specification and settled case law. *See* '405 patent at 5:36-39; *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed.

Cir. 1996) (holding that an interpretation of a claim that would exclude a preferred embodiment is "rarely, if ever, correct.").

The Court should also reject Slingshot's attempt to twist the Examiner's Notice of Allowability in an effort to support its proposed construction. In the Notice of Allowability, the Examiner briefly characterized the invention and the prior art. In describing the perceived shortcomings in the prior art of record, the Examiner stated that it failed to disclose "the chamber walls do not overlie the heater." Ex. 16 at 2. Even if this statement accurately characterizes the prior art, it is not—and was not meant to be—a characterization of the ***claims***. Thus, this statement falls far short of what would be necessary to support Slingshot's modification of the claims. *See Salazar v. Procter & Gamble Co.*, 414 F.3d 1342, 1347 (Fed. Cir. 2005) (holding that an Examiner's unilateral statements in a Notice of Allowance do not constitute a clear and unambiguous disavowal of claim scope).

4. "pitch ranging from about 600 to about 2400 dpi" ('951 patent, claim 1)

HP's Proposed Construction	Slingshot's Proposed Construction
pitch ranging from greater than 600 to 2400 dpi	Plain and ordinary meaning

This term relates to a pitch range of dots per inch (or "dpi"), which represents the number of ink dots per inch that a printhead can print at one time. Printheads of 600 dpi were well-known in the prior art. As explained below, the Applicant excluded 600 dpi systems from its claimed range of "about 600 to about 2400 dpi." Thus, if the phrase is to be construed to preserve validity, it must mean a pitch ranging from "***greater*** than 600 to [about] 2400 dpi."

On two occasions, the Applicant represented to the Examiner that the claims of the '951 patent do not cover nozzle spacing frequency of 600 dpi (dots per inch), to overcome cited prior

art. *First*, in distinguishing the claims from an HP patent, U.S. Patent No. 6,523,935 to Torgerson et al. ("Torgerson"), the Applicant stated:

> That is, adjacent nozzles in the '935 patent [Torgerson] are spaced apart with ***a pitch of 600 dpi*** or less. See column 4 lines 53-58 of the '935 patent. A second column of nozzles having the same pitch is offset from a first column of nozzles 1/1200 of an inch along the L axis. . . . Hence, ***unlike the present invention***, the '935 patent [Torgerson] requires two spaced apart and staggered columns of nozzles to achieve the same pitch or print resolution as a single column of nozzles provided by the invention of claims 1 and 20.

Ex. 17 at 5.

The Applicant's understanding that Torgerson discloses nozzles spaced apart with a pitch of 600 dpi was correct. Torgerson discloses that "the nozzle pitch P . . . is in the range of 1/300 inch to 1/600 inch." Ex. 18 at 4:53-58. "Pitch" is the distance between evenly spaced items. Ex. 19 at 1604 (defining "pitch" as "[t]he distance between similar elements arranged in a pattern or between two points of a mechanical part."); '951 patent at 2:25-29 ("For purposes of this invention, the term 'pitch' as it is applied to nozzles or ink ejection actuators is intended to mean a center to center spacing between adjacent nozzles or ejection actuators in a direction substantially parallel with an axis aligned with a columnar nozzle array."). Thus, Torgerson's disclosure of a pitch of 1/600 inch means a nozzle frequency of 600 nozzles per inch, or "dpi," as the '951 patent uses the term.

Second, in the same May 2, 2006 Amendment, the Applicant stated:

> [T]he Examiner has omitted some of the claimed elements, or at least certain important aspects of ***the claimed elements***, especially those found ***in the independent claims***. For example, Applicant's nozzle hole spacing dpi values of ***about 1200 and up to 2400 dpi*** using adjacent nozzles (i.e., a single column of nozzles).

Ex. 17 at 11.

All independent claims at that time recited "a pitch ranging ***from about 600*** to about 2400 dpi" or "a pitch ranging ***from about 600*** to about 1200 dpi." However, the above statement

of Applicant's dpi values of about ***1200 dpi*** and higher makes sense in view of the Applicant's disavowal of 600 dpi. In the inkjet printing art, nozzle spacing is often set at discrete levels, *e.g.*, 300 dpi, 600 dpi, 1200 dpi. Thus, if a claim requires a pitch greater than 600 dpi, 1200 dpi is a logical next step, and this is consistent with Applicant's description of its nozzle spacing being "about 1200 and up to 2400 dpi." Other nozzle pitches, *e.g.*, 900 dpi, are also possible. However, the Applicant indicated that 1200 dpi and higher was contemplated for the '951 patent claims.

Not only did the Applicant distinguish over 600 dpi in the prior art, but the Examiner relied on this representation that the claims exclude 600 dpi when allowing the claims over the prior art. In particular, the Examiner stated that Torgerson "do[es] not disclose adjacent nozzle holes spaced apart at a pitch ranging from ***about 600*** to about 2400 dpi." Ex. 20 at 5 (emphasis added). As set forth above, Torgerson discloses nozzles spaced apart at 600 dpi. Ex. 18 at 4:53-58. Thus, the Examiner's statement reveals a mutual understanding and reliance upon the Applicant's representations that 600 dpi was excluded from the scope of the claims. Therefore, Slingshot's attempt to construe the claimed range to encompass 600 dpi is improper and should be rejected.

Slingshot's proposal of "plain and ordinary meaning" invites error and seeks to ignore the Applicant's disavowal of 600 dpi. To secure allowance, the Applicant represented to the Patent Office that the claims do not cover 600 dpi in order to overcome HP prior art, but Slingshot is now trying to read the claims on HP 600 dpi products. The Court should adopt HP's proposed construction of "pitch ranging from greater than 600 to 2400 dpi."

5. "ink feed edge" ('951 patent, claim 1)

HP's Proposed Construction	Slingshot's Proposed Construction
Plain and ordinary meaning	an edge of the substrate over which ink is fed onto the substrate, e.g., the edge of an ink slot through the substrate or the outer edge of the substrate

Slingshot's proposed construction transforms three straightforward words into thirty and introduces confusion, not clarity. Moreover, each of the three words of the original term also reappear in Slingshot's proposed construction (including a change of "feed" to its past tense):

> an edge of the substrate over which ink is fed onto the substrate, e.g., the edge of an ink slot through the substrate or the outer edge of the substrate

Slingshot's construction lists a couple of purported examples as to what would satisfy the claim element, but this does not meaningfully clarify the scope of the term.

The term simply refers to a line from which ink is supplied. The '951 patent shows an exemplary prior art printhead in Figure 5:

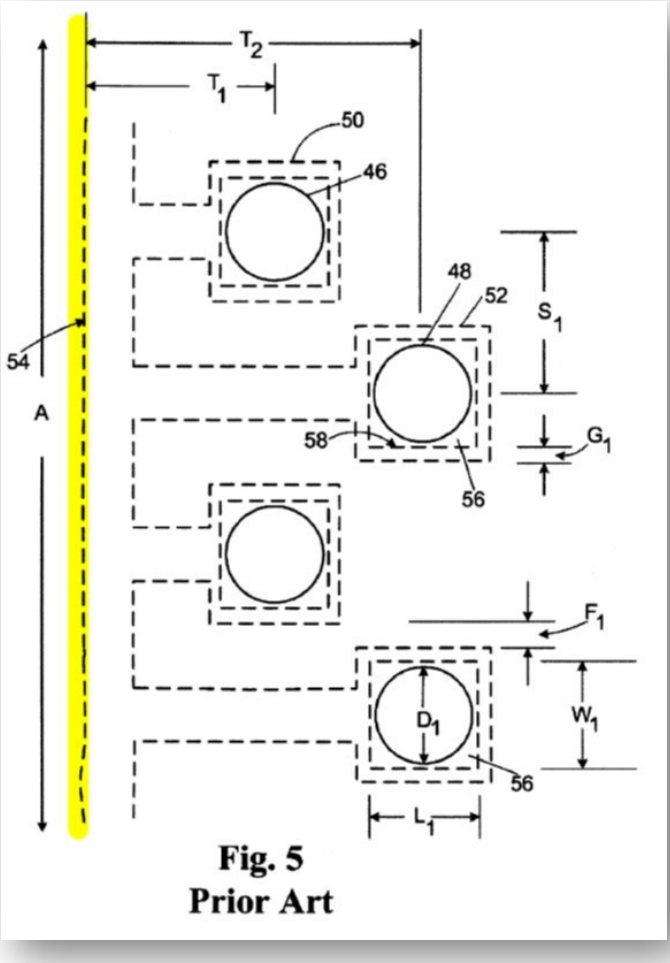


Fig. 5
Prior Art

'951 patent at Fig. 5 (annotated).

The '951 patent discloses that this printhead includes an "ink feed edge 54" (highlighted in the figure above). '951 patent at 3:54. This "ink feed edge" is simply a line from which ink is supplied to ink chambers 50 and 52. The claim term is straightforward and requires no construction. *See Polara Eng'g Inc. v. Campbell Co.*, 894 F.3d 1339, 1352 n.5 (Fed. Cir. 2018) (holding that the district court sufficiently resolved the parties' claim construction dispute by instructing jury on plain and ordinary meaning). If the Court believes that a construction is necessary, HP proposes "a line from which ink is supplied."

6. "the distance from the ink feed edge is substantially the same for each of the ink ejection actuators" ('951 patent, claim 1)

HP's Proposed Construction	Slingshot's Proposed Construction
the distance from the ink feed edge to each actuator is approximately the same such that the actuators are in a substantially linear arrangement, as opposed to a staggered arrangement	the distance from the ink feed edge to each actuator is approximately the same such that the actuators are in a substantially linear arrangement

The parties' dispute concerns only the language "as opposed to a staggered arrangement." This language is drawn directly from the Applicant's statement during prosecution when distinguishing the purported invention from prior art with a "staggered arrangement" of ink ejection actuators. The language should therefore be included, as proposed by HP.

The '951 patent is directed at a "high resolution printhead for an ink jet printer." '951 patent at Abstract. The applicant of the '951 patent recognized that the prior art included tightly spaced nozzles that yielded a high resolution. An exemplary embodiment from the prior art is shown in Figure 5 of the '951 patent.

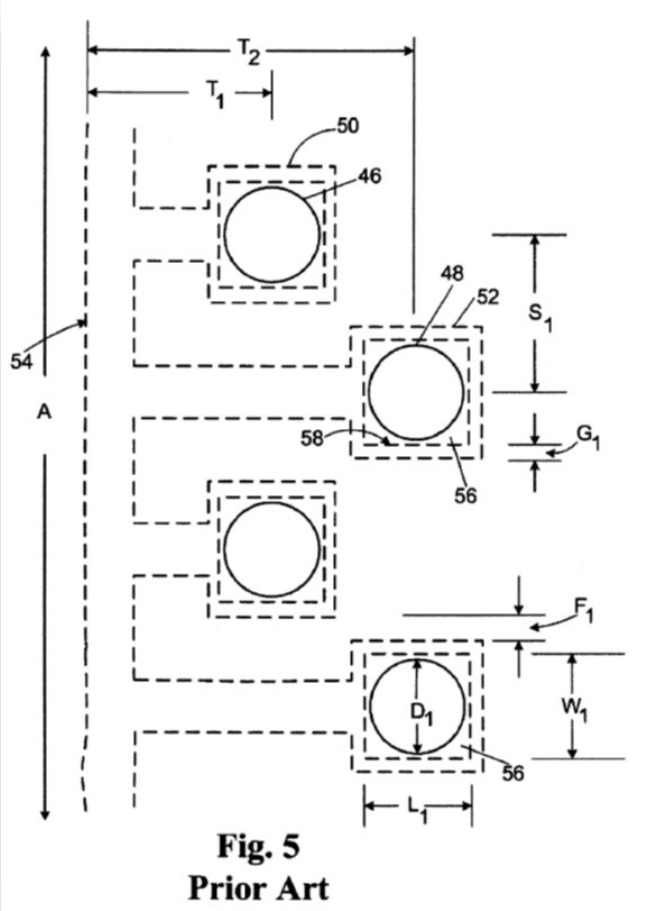


Fig. 5
Prior Art

'951 patent at Fig. 5.

The '951 patent criticizes this nozzle arrangement as "staggered." '951 patent at 3:54-57. The '951 patent defines "staggered" as follows:

> By "staggered" it is meant that a center of nozzle 46 is a distance T_1 that is less than a distance T_2 of a center of nozzle 48 to the ink feed edge 54.

'951 patent at 3:57-60.

In contrast to the prior art, the '951 patent teaches that the ink chambers are aligned in a single column, as shown in the exemplary embodiment below:

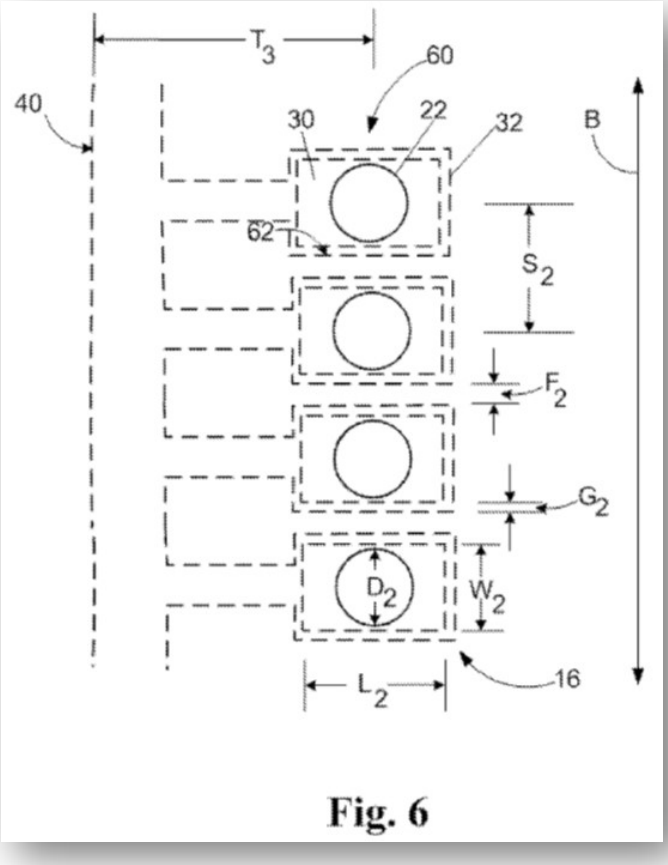


Fig. 6

'951 patent at Fig. 6.

The Applicant represented this feature as one of the purportedly distinguishing characteristics over the prior art. In order to overcome a prior art rejection, the Applicant stated:

> [A]spects of ***the invention*** enable a substantially linear arrangement of ink chambers 32 in a single column or array as shown in FIG. 6, ***as opposed to a staggered arrangement*** of ink chambers 50 and 52 as shown in FIG. 5."

Ex. 17 at 5 (emphasis added).

Therefore, the Applicant distinguished the purported invention in that it does not include a "staggered" arrangement of ink chambers. The Applicant also clearly defined "staggered" to mean having different distances from an ink feed edge. The Examiner allowed the claims in view of these statements. Therefore, the phrase "the distance from the ink feed edge is

substantially the same for each of the ink ejection actuators" should be construed to reflect the Applicant's representations. *See Springs Window Fashions LP v. Novo Indus., L.P.*, 323 F.3d 989, 995 (Fed. Cir. 2003) ("The public notice function of a patent and its prosecution history requires that a patentee be held to what he declares during the prosecution of his patent.").

Slingshot again improperly ignores the representations made to the Patent Office to obtain its claims in order to recapture what was disclaimed during prosecution. HP's construction should be adopted.

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CERTIFICATE OF SERVICE

I hereby certify that on this 1st day of July, 2020, I electronically filed the foregoing with the Clerk of Court using the CM/ECF system which will send notification of such filing to the following:

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